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AGRICULTURE AND FARMS.

Agriculture.

After all the gigantic strides this country has made along the path of industrial development since the Civil War, it still remains largely an agricultural country. Agriculture still employs a greater portion of our population than any other industry, its products continue to furnish the larger part of our exports, its successes or failures still largely determine the degree of prosperity of the community at large. It is for this reason that the subject of the Economics of American Agriculture offers the most interesting field of study for the American economist and that it ought to be the subject of the most careful inquiry at the hands of the census investigator, taking precedence of all other subjects. Unfortunately such has not been the case with the census investigations which have been carried out so far. While it is true that some progress has been made from decade to decade, the degree of perfection attained remains as yet far from the goal one might wish to see reached. Perhaps for that state of affairs the economists are more to be blamed than the statisticians who work in the government bureaus: it is the province of science to point out the lines of research and for the official statisticians to carry out the suggestions, rather than for them to take the lead.

It is not the ambition of the writer to work out in this paper any comprehensive scheme for the agricultural statistics of the twelfth census; the object is to point out some of the questions which must needs interest every economist who would undertake a study of American agriculture; for there is probably no branch of science which could make as much use of the agricultural statistics as that of economics. What then are the questions which the census statistics could and ought to answer for the economist?

The agricultural industry has undergone of late and is still undergoing a change similar to that which revolutionized the manufacturing industry, *i. e.*, the introduction of machinery.[1] It is natural to expect that the effects of such change should be far-reaching and of a very serious nature. True they can not be as radical as in the manufacturing or mining industry, owing to the peculiar conditions prevailing in agriculture, yet they have made themselves sufficiently felt to precipitate in England the troublesome question of "agricultural depression" and to give us a silver craze in this country which even to-day has not quite subsided.

The statistical data furnished by the census should be of such a nature, therefore, as to enable us to see whether, and if so where, the small farm is able to resist the competition of the large one, as well as the conditions which make its position different from that of the small workshop in the manufacturing industry. While our agricultural statistics answer one set of questions in this connection, they are altogether silent on another. From a perusal of the census volume we may learn to what extent the total agricultural product of this country has increased, how the products of the various crops have been growing or fluctuating from decade to decade; we can trace the same for the separate states and sometimes for counties; we can tell the amount of cotton in pounds and bales each state has produced, and trace it back for a few decades,—

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[1] Tenth Census 3:513, 520,f. and 530 (volume pages.) Report on Cereal Productions, 133, 140,f., 150.

facts, no doubt, of great interest and value,—but, if we were to ask, how have the introduction of farm machinery, the improvements in grain transportation, etc., affected the economy of the farm, the official statistics would give us but little satisfaction. To enable us to find an answer, the data relating to cost of implements and machinery, fertilizers, live-stock, etc., should be arranged in such a way as to reflect conditions in each economic group, according to the classification adopted by the census. To explain: both the tenth and eleventh censuses contain a "classification of farms by acreage and tenure by counties," marked "Table 5," which gives three classes of farms according to the mode of tenure, viz., farms owned, those rented for fixed money value, and those rented for share of products. Each of these classes is subdivided into seven groups, according to size of farms. I shall have a word to say later on about the latter classification; for the present let us see what we can and what we can not learn from it.

As far as the classification goes it is excellent. By constructing proper tables from the data given there, we may be able to tell what type of farm is forging its way ahead in the various parts of the country; whether it is the 20–50 acre farm as is the case in the cotton-growing states, or the 100–500 acre, as the tendency seems to be in the north and especially in the northwest. One can, to some extent, answer the question whether the "bonanza" farm is holding its own or crumbling up into smaller holdings, and whether the latter are as small as those resulting from the ruin of the old slave plantations in the south; one can tell whether the tendency is toward an increase or decrease of farms cultivated by owners as against those rented, and finally whether the increase in rented farms represents a transition stage from the position of the farm laborer to that of the farm owner, or *vice versa.* That is as far as we can go, although with the student of economics the above is only the beginning of his journey. The next question one naturally asks oneself is, what are the economic causes at work which are responsible for the one or the other tendency. There is no answer to that in the census, and yet the data actually collected by the census enumerators are amply sufficient to give one.

Table 6 of the volume on Agriculture, following immediately the table containing the classification of farms, gives the "number, acreage, and valuation of farms and products, with cost of fertilizers *by counties.*" The last two words explain the utter uselessness of the table. There can hardly be any interest,—outside perhaps of mere local interest, which could, however, be much better satisfied through other sources,—in the fact that Nance county in the state of Nebraska had in 1890, 1,092 farms covering an area of 215,058 acres, the cost of land, fences, and buildings being $4,108,738, that of implements and machinery $151,478, that of live-stock $1,004,209, and the estimated value of farm products $669,770. But were all these data arranged according to the size of farms as given in Table 5, they would be of immense value. We could then see that, while the 500–1000 acre farm invests a certain fraction of its total capital in machinery, the 100–500 spends it, say, on live-stock, and the 20–50 on something else. We could also tell what the expenditure is per unit of product in the case of each of the seven groups of farms, and consequently which is likely to be the winner in the competitive race on the world's market. This is practically the only way to determine whether an increase or falling off in the number of farms in any particular group is merely accidental, due probably to some local influences, or whether it is due to important economic causes and thus indicates an actual tendency for the future. It is worth pointing out that the tabulation suggested would not involve any additional work in gathering the data; it would only require greater labor in their compilation and increase somewhat the bulk of the volume, unless other less important matters were left out. The lack of classification, as just pointed out, constitutes the most serious defect of the preceding censuses. Let us see now how the classification suggested above could be carried out in other respects.

1. *Cereals.* Under this heading we are given, in the eleventh census, figures relating to total area of land under cereals in general and the several crops in particular for several decades; the same is then carried out for the separate states to show the varying proportion each state has contributed to the total product of the country at various periods. Then follows a similar series of data with regard to total production (in bushels), and finally we have the distribution of the various crops by altitudes, a point of greater interest to the agriculturist than to the economist.

What would be gained if we had the data arranged according to size of farms? We could first see what particular type of farm tends more to specialization on one or very few crops, and which are the ones that advantageously adopt a more diversified system of cultivation. Secondly, after the system had been carried out for more than one census, we could tell what was the tendency in that respect with the various types of farms, large, medium and small. Knowing from the data mentioned before what the total product of the farm was as well as its expenses (a point we shall consider later) we could tell what method of farming was the most profitable one for the particular type. We would further know what group of farms, (according to size) furnished the greater part of a given crop both absolutely and relatively, what type of farm was better adapted for intensive or extensive cultivation, which of the two methods paid better, what states were more favorable to one or the other method and why.

2. What has been said with regard to the classification of cereals applies with equal force to figures relating to fruit growing, market gardening, cotton raising, etc., as well as to unimproved land. The latter point is especially interesting, as it would give us a means of determining whether the area of unimproved land in a farm had any connection with its size.

3. *Live-stock.* The number of horses and other working-animals on the farm as well as their value should be given for the various groups of farms. This would show whether the amount of capital invested in working-animals was less per acre and per unit of product in the large farm than in the small one.

4. *Implements and machinery.* This should be carried out according to size of farms, as with the other items. Four more columns should be added under this head: (a) average length of service of the machinery; (b) its cost per year; (c) rent paid for itinerant machines;[1] (d) total cost of machinery per year. The cost of live-stock and machinery will show

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[1] Owners of farms of moderate size who can not afford to buy a costly steam-thrasher or other expensive machine, but have a sufficiently large product to give at least a day's work to such a machine, hire it from owners, who rent it to the neighbors for a certain sum. These machines are called itinerant machines. (Cf. Tenth Census, 3 : 529, folio page.)

what type of farm has the economic advantage after we take into account the amount of money spent yearly in wages. That brings us to the question of the

5. *Working force employed on a farm.* Five columns may be arranged under this head:

(a) Members of the family engaged in work on the farm.

(b) Number of hired laborers employed.

(c) Total work-days during the year put in by hired labor.

(d) Amount expended in wages.

(e) Average length of employment of a laborer per year.

A word or two in explanation of this table. In the special investigation undertaken by Professor Brewer in connection with the tenth census, one of the questions in the schedule worked out by him read as follows: "What proportion of the hired labor of the grain farms is hired by the month or year? What proportion is hired by the day?"[1] The question, with the word "grain" left out, is practically repeated in the table just suggested. The question of labor and of the expense involved in hiring it is a highly important one. It is claimed that the "bonanza" farm is in a better position than the moderate or small farm to conduct its business on the principles of manufacturing industry. It hires its gangs of laborers for the busy season and discharges them as soon as they are not wanted, leaving but a very small number of men to attend to the live-stock, repairs, etc., during the winter. The small farmer is said to be unable to employ his help in strict conformity with such a system. The table is intended to bring out to what extent that is true of the farms of different sizes.

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[1] *Idem*, 3:430, question 8.

6. *Fertilizers.* The same general remarks as to the necessity of giving cost for each group of farms hold true here. The usefulness of a classification like the one proposed appears under this head more than elsewhere, as it will give a direct indication where a more intensive cultivation prevails.

An additional table could now be constructed giving absolute and relative yearly cost of machinery, fertilizers, live-stock, and labor, for each of the several groups of farms.

As to the census classification of farms, it is on the whole excellent. The gradation adopted—farms under ten acres, ten to twenty, twenty to fifty, fifty to one hundred, one hundred to five hundred, five hundred to one thousand, one thousand acres and over,—is with one exception very practical, as it takes account of distinct types of farms, neither multiplying unnecessarily the number of groups, nor ignoring important subdivisions. The one exception is the 100–500 acre group. It is well known that a normal type of farm, one which keeps an average family in comfort, furnishing sufficient work to its working members, with perhaps an additional hand or two to be hired, is equal to about 160 acres. There can be no denying the fact that the difference between a five hundred acre farm and one containing one hundred and fifty acres is too large to allow of their being classed together. The economic and even social status of the owner of the former is quite different from that of the latter. In making a study of the agricultural statistics of the tenth and eleventh censuses, the writer found that the group of farms under discussion constituted more than half of all the farms in the North Central and Western divisions in 1890, and that it had increased considerably since 1880. As the 160 acre farm may be justly considered a sort of landmark between the smaller type, which is barely sufficient to give enough employment to its owner, and the larger, which represents a purely capitalistic undertaking requiring a considerable outlay of capital and employment of labor, it, more than any other group, ought to be singled out instead of being merged into a higher one.

In view of all this, it seems desirable that the group 100–500 be subdivided in the twelfth census into two; one, let us say, of 100–200 acres, and the other of 200–500. The only objection which could be urged against such an innovation is that it would make the data incomparable with those of preceding censuses. But even that could be obviated by constructing an additional column giving the total for the two subdivisions. It may not be out of place to mention here that the same subdivisions have been adopted in the agricultural statistics of Great Britain.[1]

Another serious defect in the eleventh census, due to the fault of the enumerators rather than the statisticians in the Census Office, is the loose way in which farms and their subdivisions have been recorded in the census schedules. In commenting upon the decrease of the number of farms exceeding 500 acres each in the South Central division, Mr. Hyde, the author of the report on Statistics of Agriculture, remarks: "This may be due to reporting certain large plantations in one case as single farms and reporting their various subdivisions in the other case as separate holdings."[2] It is plain that, unless a remedy be found for that in the twelfth census, the figures will be worse than useless, they will be misleading. And yet there can hardly be a more interesting as well as important question for the economist than that whether or not the old slave plantations have been crumbling up under the new conditions of southern agriculture.

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[1] See for instance Agricultural Statistics of Ireland for the year 1891.

[2] Eleventh Census. Agriculture, 2.

It seems that the difficulty might easily be obviated if the enumerators were instructed to enter upon their schedules, in case of farms rented, only the land held by the lessee and not that leased by the lessor. Let us suppose, for illustration, that a farm of six hundred acres is visited. If four hundred acres are cultivated by the owner himself, they are to be entered on the schedule. The two hundred acres will find their way into the census when the lessee is called upon by the enumerator. There could be no repetition under such a system and from the data of two or three censuses we could tell whether the large plantations continued to be cultivated by their owners or were sublet or sold in smaller subdivisions.

There remains now a word or two to be said upon the method of classification according to mode of tenure. If the suggestions made in this paper were carried out in the main, it would be better to arrange all the data under the seven (or eight as has been suggested) heads corresponding to size of farms, leaving out the tables arranged according to mode of tenure. Instead of the latter, three columns might be arranged under each of the seven or eight tables, with the headings, "owned," "rented for share of product," and "rented for fixed money value." One of the advantages to be gained by such a re-arrangement of material would be the doing away with a source of error which among other things revealed itself in the considerable disparity in the numbers of farms recorded in the volumes on Agriculture and on Farms and Homes respectively. The discrepancy between the results in the respective volumes can not be entirely explained away, as the writer in the census volume attempts to do, by the fact that the number of owners and the number of farms are not identical. It is due more to the method of classification now referred to. Let us assume a case of a farmer cultivating a piece of land of one hundred and fifty acres. If one hundred acres are owned by him, and fifty are rented, he would appear twice in the tables of the census: first, under the head of farms "cultivated by owners" and secondly, under that of "rented." Instead of getting the right conception of a farmer owning a hundred acres and sufficiently prosperous to be able profitably to rent some additional land, which is probably his first step toward a permanent "expansion of his territory," we gain the false impression of two farms one of one hundred acres owned and the other of fifty acres rented. A classification which allows correctly gathered data to be grouped in a way to create such an erroneous impression stands self-condemned. Under the method of classification suggested the figures would more exactly reflect the true state of affairs. The detailed representation of individual farms (if given in the census) would be something like this:

Size of Farm in Acres.	Owned. Acres.	Rented for fixed money value. Acres.	Rented for share of product. Acres.
150	100	50	
300	150	50	100
250	250	—	—

etc.

In the general tables for a given geographical division some such form as the following might be adopted:

NUMBER OF FARMS.[1]

Size of Farms in Acres.	Owned.	Partly owned, partly rented.	Rented for fixed money value.	Rented for share of product.
100–200	500	4,000	569	214
200–500	647	493	312	245

etc.

The writer is fully conscious of the shortcomings of the last table. The second column giving farms "partly owned, partly rented" would leave us in the dark as to what particular part of the farms is owned and what rented; also as to whether it is rented for money or a share of product. But it will at least do away with the heretofore unavoidable multiplication of the number of farms and the other errors incident thereto. Moreover, if desired, some attempt at bringing out the other facts could be made by means of a table constructed on some plan like that of table 4 (see below, p. 218).

It is greatly to be regretted that the methods which have to be pursued in getting statistics of farm-indebtedness are of such a nature as to make impossible the gathering of data relating thereto by the census enumerator. Were it not for that, our knowledge of agricultural economics would no doubt profit greatly by having these data arranged side by side with the other data given in the volume on Agriculture. The advantage which would be gained from the student's point of view is too obvious to need being pointed out. But I may perhaps be allowed to express a wish that when the data upon mortgage indebtedness are published in the future they be arranged not only by decades and by localities, as has been done in the eleventh census, but also according to size of farms. The latter, like nearly all the other suggestions made here, does not call for any additional work in the field, but merely for a more comprehensive tabulation of data which at present come into the possession of the Census Office.

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[1] The principle is more completely worked out in Table 1 (see below, p. 216).

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APPENDIX.

For the purpose of giving a graphical summary of what has been proposed here, the following tables have been prepared more with the view to indicate the direction in which changes are desirable, than with the idea of making them supplant the old tables in the census volume; that they are far from any degree of perfection none is more conscious than the author himself.

A number of useful tables could be prepared in addition to these submitted here, giving the production of various agricultural crops from cereals to cotton and flax by each of the eight groups of farms, just as they are carried out in the eleventh census by states and counties.

TABLE I.—CLASSIFICATION OF FARMS BY ACREAGE AND TENURE.

1. Farms under 10 acres:
    a. Owned.
    b. Partly owned and partly rented.
    c. Rented for fixed money value.
    d. Rented for share of products.
        Total.
2. Farms of between 10 and 20 acres (similarly classified).
3. " " 20 and 50 " " "
4. " " 50 and 100 " " "
5. " " 100 and 200 " " "
6. " " 200 and 500 " " "
7. " " 500 and 1000 " " "
8. " 1000 acres and over.
9. Total number of farms.

TABLE 2.—NUMBER, ACREAGE AND VALUATION OF FARMS AND PRODUCTS, WITH COST OF FERTILIZERS.

1. Farms under 10 acres :

a. Acres under crops.

Acres under wheat.	Per cent of total acreage.
“ “ corn.	“ “ “
“ “ oats.	“ “ “
“ “ barley.	“ “ “
“ “ cotton.	“ “ “
“ “ green crops.	“ “ “
“ “ orchard.	“ “ “
“ “ other crops.	“ “ “
Total acres under crops.	“ “ “
Per cent unimproved of total acreage.	

b. Valuation.

Land.
Fences and buildings.
Live stock. (a. Working animals. b. Animals kept for other purposes. c. Yearly cost of working animals).
Implements and machinery. (a. Cost of machinery on hand. b. Average cost of machinery per year. c. Rent paid for itinerant machines. d. Total cost of machines per year.
Cost of fertilizers.
Value of products.

c. Working force.

a. Number of members of family engaged in work on the farm.
b. Number of hired laborers employed.
c. Total number of working days by hired labor during the year.
d. Amount paid in wages during the year.
e. Average length of employment (in days) per year.

The same classification for farms of each group of sizes, as shown in Table 1.

TABLE 3.—DISTRIBUTION OF YEARLY EXPENDITURE ACCORDING TO SIZE OF FARMS.[1]

(Total expenditure of class = 100 per cent).

Farms under 10 acres :
Per cent of total expenditure for wages.
“ “ “ for fertilizers.
“ “ “ for machinery.
“ “ “ for live stock.
And so for the farms of various sizes.

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[1] Buildings have not been included in this table, as their yearly cost is the resultant of so many uncertain elements that it would be difficult to get any accurate returns on that point.

TABLE 4.—Farms Partly Owned and Partly Rented.

a. For fixed money value, or
b. For share of product.

1. Farms of less than 10 acres:
Less than 10 per cent of farm owned.
10–25 “ “
25–50 “ “
50–75 “ “
75–100 “ “
And so for the farms of various sizes.